Manitoba Agriculture and Food

Guidelines for Estimating Cost of Raising Dairy Heifers

Based on 100 head

formation Update

www.gov.mb.ca/agriculture/

Date: July, 2002

The following budget is an estimate of the cost of production for raising large breed dairy heifers from birth to first calving. The purpose of this budget is to assist Manitoba producers in calculating their own costs, which also take into consideration factors that should be included when budgeting to determine the total rearing costs. To assist in developing their own budgets an Excel spreadsheet is available on the Manitoba Agriculture and Food website.

Dairy replacement heifers are the future foundation of a dairy herd and represent the primary source of genetics for improved production and conformation. Replacing heifers constitutes a significant financial investment. Total rearing cost is typically the third largest expense of a dairy operation after feed and labour costs. With the exception of a few heifers sold as culls or breeding stock prior to first calving, heifers do not generate any revenue until they enter the milking herd.

The primary objectives of any heifer rearing program should include cost control and attaining average daily gains that result in heifers calving by 23 to 24 months of age at body weights of 1200 to 1250 pounds (after calving) for large breeds and 700 to 725 pounds (after calving) for small breeds.

This budget assumes a total confinement system from birth to calving; however, input fields are included to allow the entry of pasture costs in those situations where heifers are pastured part of the year.

This budget, which can be used by dairy producers as well as custom heifer growers, assumes heifer rearing as a separate enterprise from the dairy operation. Current market values are applied to heifer calves at birth, which will vary due to herd genetic differences and market conditions.

Disclaimer: Since economics and animal performance will vary among farms due to differences in environment, management, nutrition, health, sanitation and biosecurity, Manitoba Agriculture and Food (MAF) will not be responsible for individual farm results that may differ from those assumed in this budget.

Dairy Heifer Raising Costs - July, 2002
Based on 100 Head

A. OPERATING COSTS	$/Heifer	Total	Your Farm
1. Feed Costs:			
1.01 Colostrum	$3.00	$300	
1.02 Milk Replacer	$73.70	$7,370	
1.03 Milk	$0.00	$0	
1.04 20% Calf Starter	$14.40	$1,440	
1.05 TMR	$0.00	$0	
1.06 Hay	$434.12	$43,412	
1.07 Silage	$0.00	$0	
1.08 Grower Ration	$96.00	$9,600	
1.09 Grain (barley)	$130.68	$13,068	
1.10 Protein (canola)	$10.41	$1,041	
1.11 Salt/Minerals/Vitamins	$19.00	$1,900	
1.12 Pasture	$0.00	$0	
Total Feed Cost	**$781.31**	**$78,131**	
2. Other Operating Costs:			
2.01 Heifer Cost	$400.00	$40,000	
2.02 Breeding Cost	$77.00	$7,700	
2.03 Veterinary Medicine & Supplies	$49.32	$4,932	
2.04 Registration Fee	$15.00	$1,500	
2.05 Bedding	$45.12	$4,512	
2.06 Utilities	$18.05	$1,805	
2.07 Manure Removal	$20.05	$2,005	
2.08 Repairs & Maintenance	$40.11	$4,011	
2.09 Insurance	$23.02	$2,302	
2.10 Miscellaneous	$15.04	$1,504	
2.11 Death Loss	$56.52	$5,652	
Subtotal Operating Costs	$1,540.54	$154,054	
2.12 Operating Interest	$116.75	$11,675	
Total Operating Costs	**$1,657.29**	**$165,729**	
B. FIXED COSTS			
3. Depreciation			
3.01 Facilities	$90.25	$9,025	
3.02 Machinery & Equipment	$46.79	$4,679	
4. Investment			
4.01 Land	$4.01	$401	
4.02 Facilities	$44.12	$4,412	
4.03 Machinery & Equipment	$16.85	$1,685	
Total Fixed Costs	**$202.02**	**$20,202**	
Total Operating and Fixed Costs	**$1,859.31**	**$185,931**	
C. LABOUR	**$240.66**	**$24,066**	
TOTAL COST OF PRODUCTION	**$2,099.97**	**$209,997**	

DAIRY HEIFER REPLACEMENT COST

Heifer Enterprise Profile

Number of replacements		**100** head
Mortality rate (%)		**6.0%** mortality
Calf market price ($/head)		**$400** /head
Months birth to first calving	**24.0** months	**732** days
Individually housed (weaned at 45 days + 15 days transition)		**60** days
Group housed (from weaning transition period to 1st calving)		**672** days
Birth weight (lbs)		**100** lbs
Weight at end of post weaning 15 day transition period		**150** lbs
First calving weight:		
Pre-calving weight (lbs)		**1,375** lbs
Post-calving weight (lbs)		**1,225** lbs

Rearing Periods

To more closely estimate the cost of raising a replacement heifer to first calving, **(for this budget we assumed 24.0 months of age)**, the rearing program was separated into eight periods. They are:

Period 1	Birth - 2 months	**60** days	birth-150 lbs
Period 2	2 - 4 months	**60** days	150 - 260 lbs
Period 3	4 - 6 months	**60** days	260 - 370 lbs
Period 4	6 - 9 months	**90** days	370 - 540 lbs
Period 5	9 - 12 months	**90** days	540 - 700 lbs
Period 6	12 - 16 months	**120** days	700 - 925 lbs
Period 7	16 - 20 months	**120** days	925 - 1,150 lbs
Period 8	20 mo - calving	**132** days	1,150 - 1,375 lbs

Milk Replacer - Assume that colostrum then transition milk is fed the first 3 days (6 feedings), then the calf is switched to a good quality all milk protein based milk replacer containing 18-20% fat and 18-20% CP up to weaning at 45 days. Other possible liquid feeds include whole milk or waste milk; however, this budget assumed the use of a milk replacer.

Calf Starter - A palatable, commercial 18-20% CP calf starter is introduced in very minute quantities by the end of the first week and gradually increased to about 1.8 lbs/day at weaning at 45 days (6 weeks). For about 15 days following weaning the calf continues to receive calf starter but this is gradually reduced to zero as it is replaced by a **16-18% CP Grower Ration**.

Energy/Protein Feeds - For the first 6 months this budget assumes that a commercial calf starter is fed up until shortly after weaning at which time the calf is switched to a farm-mixed grower ration. Due to the variation in possible rations that can be fed to growing heifers from 6 months onward, this budget substitutes barley supplemented with canola meal for the 16-18% grower ration. Some producers may want to continue feeding a mixed grower ration from 6 months onwards in place of separate amounts of barley and canola meal. This budget provides the user with the flexibility to vary the concentrate and protein feeds fed from 6 months of age to first calving.

Coccidiostat or Ionophore - To provide animals with added protection from contracting coccidiosis and to improve feed efficiency, growth rates and general health, it is assumed that a coccidiostat or ionophore is included in the grain ration beginning with the calf starter. A nutritionist should be consulted to develop a feeding program that incorporates a coccidiostat or ionophore in the correct concentrations beginning at about one week of age.

Hay - Assumed that a fine-stemmed, grassy:legume hay with 15% crude protein (CP) and a Relative Feed Value (RFV) of 140 is fed as the sole forage to all age groups. A wastage factor of 10% is included in the amount of hay fed/head/day across all age groups. Users of this budget may replace part or all of the hay with silage or pasture following 6 months of age; however, a nutritionist should be consulted to ensure that total daily dry matter intake is not reduced due to feeding excess silage or pasture to animals particularly in the 6 to 9 months of age group.

Salt/Minerals/Vitamins - Typically the amount of salt, minerals and vitamins fed will vary from about 1.0 to 2.5 ounces/head/day among the various age groups. Assume that a total of 34 kgs (76 lbs) of salt/mineral/vitamins is fed per head over the total rearing period. NOTE: This amount would be less if a grower ration including salt/mineral/vitamins is fed.

FOOTNOTE: Pasturing of heifers less than six months of age is not recommended, therefore, for budgeting purposes we restrict the allocation of pasture costs to those period groups from six months of age onwards (or periods 4 through 8).

Pasture Details

Pasture Cost	**$0.00** /head/day	
Average Number of Heifers on Pasture	**0** head	
Average Months on Pasture per Year	**0.0** mo.	**0 days**
Average age at calving	**0.0** mo.	**0 days**
Ave. Months on Pasture to Calving Age	**0.0 mo.**	**0 days**
Distribution of Pasture vs Confinment (Periods 4-8)		
Pasture	**0 days**	**0 %**
Confinement	**552 days**	**100 %**
Total Days	**552 days**	**100 %**

Per Period Feeding Days

Period	Confined (Periods 1-8)	Pasture	Total
1	60	0	60
2	60	0	60
3	60	0	60
4	90	0	90
5	90	0	90
6	120	0	120
7	120	0	120
8	132	0	132
Total	**732**	**0**	**732**

Feed Requirements and Days on Feed

	Period Age Group (Months)	Period Days	Body Weight (lbs)	Feed Lbs/Day	Days Fed	Total Lbs Fed
Period 1	**Birth - 2 months**	**60**	**birth-150**			
Colostrum				10.0	3	30
Milk Replacer				1.3	42	55
Milk				0.0	0	0
20% Calf Starter				1.3	55	72
Grower Ration				0.0	0	0
Hay				0.75	30	23
Period 2	**2 - 4 months**	**60**	**150 - 260**			
TMR				0.0	0	0
Hay				2.0	60	120
Silage				0.0	0	0
Grower Ration				4.5	60	270
Grain (barley)				0.0	0	0
Protein (canola)				0.0	0	0
Salt/Minerals/Vitamins	**(ounces)**			0.0	0	0
Period 3	**4 - 6 months**	**60**	**260 - 370**			
TMR				0.0	0	0
Hay				5.0	60	300
Silage				0.0	0	0
Grower Ration				5.5	60	330
Grain (barley)				0.0	0	0
Protein (canola)				0.0	0	0
Salt/Minerals/Vitamins	**(ounces)**			0.0	0	0
Period 4	**6 - 9 months**	**90**	**370 - 540**			
TMR				0.0	0	0
Hay				9.0	90	810
Silage				0.0	0	0
Pasture					0	
Grower Ration				0.0	0	0
Grain (barley)				5.0	90	450
Protein (canola)				0.5	90	45
Salt/Minerals/Vitamins	**(ounces)**			2.2	90	12
Period 5	**9 - 12 months**	**90**	**540 - 700**			
TMR				0	0	0
Hay				12.0	90	1,080
Silage				0.0	0	0
Pasture					0	
Grower Ration				0.0	0	0
Grain (barley)				5.0	90	450
Protein (canola)				0.4	90	36
Salt/Minerals/Vitamins	**(ounces)**			2.2	90	12

	Period Age Group (Months)	Period Days	Body Weight (lbs)	Feed Lbs/Day	Days Fed	Total Lbs Fed
Period 6	**12 - 16 months**	**120**	**700 - 925**			
TMR				**0**	**0**	**0**
Hay				**16.0**	**120**	**1,920**
Silage				**0.0**	**0**	**0**
Pasture					**0**	
Grower Ration				**0.0**	**0**	**0**
Grain (barley)				**5.0**	**120**	**600**
Protein (canola)				**0.3**	**120**	**36**
Salt/Minerals/Vitamins (**ounces**)				**2.2**	**120**	**17**
Period 7	**16 - 20 months**	**120**	**925 - 1,150**			
TMR				**0**	**0**	**0**
Hay				**22**	**120**	**2,640**
Silage				**0**	**0**	**0**
Pasture					**0**	
Grower Ration				**0**	**0**	**0**
Grain (barley)				**4**	**120**	**480**
Protein (canola)				**0**	**0**	**0**
Salt/Minerals/Vitamins (**ounces**)				**2.2**	**120**	**17**
Period 8	**20 mo - calving**	**132**	**1,150 - 1,375**			
TMR				**0**	**0**	**0**
Hay				**30**	**132**	**3,960**
Silage				**0**	**0**	**0**
Pasture					**0**	
Grower Ration				**0**	**0**	**0**
Grain (barley)				**3**	**132**	**396**
Protein (canola)				**0**	**0**	**0**
Salt/Minerals/Vitamins (**ounces**)				**2.2**	**132**	**18**
Total Days		**732**				

FOOTNOTE: The quantity of salt/mineral/vitamins fed per day is expressed in OUNCES, whereas the total quantity fed each period is presented in TOTAL LBS.

Summary and Cost of Feeds Used

Feed Costs			
Feed	Cost per Unit	Amount per Unit	Cost per Pound
Colostrum	$0.10	1 lb	$0.10 /lb
Milk Replacer	$59.00	20 kg	$1.34 /lb
Milk	$0.60	1 liter	$0.26 /lb
20% Calf Starter	$10.75	25 kg	$0.20 /lb
TMR	$100.00	2,000 lbs	$0.050 /lb
Hay	$80.00	2,000 lbs	$0.040 /lb
Silage	$30.00	2,000 lbs	$0.015 /lb
Grower Ration	$8.75	25 kg	$0.160 /lb
Grain (barley)	$120.00	2,205 lbs	$0.055 /lb
Protein (canola)	$195.00	2,205 lbs	$0.089 /lb
Salt/Minerals/Vitamins	$13.75	25 kg	$0.250 /lb

	Rearing Periods - total lbs of feed consumed								
	1	2	3	4	5	6	7	8	Total
Colostrum	30								30
Milk Replacer	55								55
Milk	0								0
20% Calf Starter	72								72
TMR		0	0	0	0	0	0	0	0
Hay	23	120	300	810	1,080	1,920	2,640	3,960	10,853
Silage		0	0	0	0	0	0	0	0
Grower Ration	0	270	330	0	0	0	0	0	600
Grain (barley)		0	0	450	450	600	480	396	2,376
Protein (canola)		0	0	45	36	36	0	0	117
Salt/Minerals/Vitamins		0	0	12	12	17	17	18	76

Per Period Feed Costs $/Head								
Confinement	$92.02	$48.00	$64.80	$64.16	$74.15	$117.25	$136.25	$184.68
Pasture	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$92.02	$48.00	$64.80	$64.16	$74.15	$117.25	$136.25	$184.68

Per Period Feed Costs $/Head/Day								
Total Feed $/Day	$1.53	$0.80	$1.08	$0.71	$0.82	$0.98	$1.14	$1.40

FOOTNOTE: The quantity of salt/mineral/vitamins in each rearing period is TOTAL LBS.

Dairy Heifer Raising Cost Worksheet

			Your Cost
A. OPERATING COSTS			
1. Feed Costs:			
1.01 Colostrum			
	30	lbs	
x	$0.10	$/lb	
=	**$3.00**	**/heifer**	
1.02 Milk Replacer			
	55	lbs	
x	$1.34	$/lb	
=	**$73.70**	**/heifer**	
1.03 Milk			
	0	lbs	
x	$0.26	$/lb	
=	**$0.00**	**/heifer**	
1.04 20% Calf Starter			
	72.0	lbs	
x	$0.20	$/lb	
=	**$14.40**	**/heifer**	
1.05 TMR			
	0.0	lbs	
x	$0.050	$/lb	
=	**$0.00**	**/heifer**	
1.06 Hay			
	10,853	lbs	
x	$0.040	$/lb	
=	**$434.12**	**/heifer**	
1.07 Silage			
	0	lbs	
x	$0.015	$/lb	
=	**$0.00**	**/heifer**	

			Your Cost
1.08 Grower Ration			
	600	lbs	
x	$0.16	$/lb	
=	**$96.00**	**/heifer**	
1.09 Grain (barley)			
	2,376	lbs	
x	$0.055	$/lb	
=	**$130.68**	**/heifer**	
1.10 Protein (canola)			
	117	lbs	
x	$0.089	$/lb	
=	**$10.41**	**/heifer**	
1.11 Salt/Minerals/Vitamins			
	76	lbs	
x	$0.25	$/lb	
=	**$19.00**	**/heifer**	
1.12 Pasture Cost			
	0	total days on pasture to calving	
x	$0.00	$/head/day	
x	0	heifers on pasture	
÷	100	total heifers	
=	**$0.00**	**/heifer**	
2. Other Operating Costs:			
2.01 Heifer Cost	**$400**	**/heifer**	
2.02 Breeding Cost			
	$25.00	semen cost	
x	1.75	services/conception	
=	$43.75	/heifer	
	$19.00	service cost	
x	1.75	services/conception	
=	$33.25	/heifer	
Total =	**$77.00**	**/heifer**	

2.03 Veterinary Medicine & Supplies

			Your Cost
Herd Health	$90.00	/hour charge	
x	1.5	hours/visit	
x	4	visits/year	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	$10.83	/heifer	
Mileage (Herd Health)			
	$1.20	rate/km charge	
x	60	km (one way)/visit	
x	4	visits/year	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	$5.78	/heifer	
Emergency Calls	$200.00	charge/call	
x	2	calls/year	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	$8.02	/heifer	
Emergency Mileage	$1.95	rate/km	
x	60	kms (one way)/visit	
x	2	visits/year	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	$4.69	/heifer	
Supplies (drugs, vaccines, etc.)			
	$2,000	total supplies	
÷	100	heifers	
=	$20.00	/heifer	

				Your Cost
Total	**=**	**$49.32**	**/heifer**	
2.04 Registration Fee				
	=	**$15.00**	**/heifer**	
2.05 Bedding				
		0.75	tonnes/heifer/year	
	x	732	days rearing period	
	÷	365	days/year	
	x	$30.00	$/tonne	
	=	**$45.12**	**/heifer**	
2.06 Utilities				
		$900.00	annual cost	
	x	732	days rearing period	
	÷	365	days/year	
	÷	100	heifers	
	=	**$18.05**	**/heifer**	
2.07 Manure Removal				
		$1,000.00	annual cost	
	x	732	days rearing period	
	÷	365	days/year	
	÷	100	heifers	
	=	**$20.05**	**/heifer**	
2.08 Repairs & Maintenance				
		$1,000	annual fuel cost	
	+	$1,000	oil, repairs & maintenance	
	x	732	days rearing period	
	÷	365	days/year	
	÷	100	heifers	
	=	**$40.11**	**/heifer**	
2.09 Insurance				
		$140,000	bldg. & equip. investment	
	x	$0.50	cost/$100 capital	
	÷	$100	units of $100	
	x	732	days rearing period	
	÷	365	days/year	
	÷	100	heifers	
	=	$14.04	/heifer	

				Your Cost
		$1,000	average value of heifer	
	x	$0.40	insurance rate/$100	
	÷	$100	units of $100	
	x	732	days rearing period	
	÷	365	days/year	
	=	$8.02	/heifer	
		$48.00	add'l coverage for liability	
	x	732	days rearing period	
	÷	365	days/year	
	÷	100	heifers	
	=	$0.96	/heifer	
Total	=	**$23.02**	**/heifer**	
2.10 Miscellaneous		$750.00	total expenses/year	
	x	732	days rearing period	
	÷	365	days/year	
	÷	100	heifers	
	=	**$15.04**	**/heifer**	
2.11 Death Loss				
		$400.00	heifer cost	
	+	$542.01	half of feed & other costs	
	x	6.0%	mortality rate	
	=	**$56.52**	**/heifer**	
2.12 Operating Interest				
		$400.00	heifer cost	
	+	$570.27	half of feed & other costs	
	x	6.0%	operating interest rate	
	x	732	days rearing period	
	÷	365	days/year	
	=	**$116.75**	**/heifer**	

CAPITAL COSTS

			Your Cost
Land Cost			
Acres	10		
Cost/Acre	$500	**$5,000**	
Dairy Heifer Facility (see schematic of facility design in appendix)			
Building 68'x80'=5440 ft^2 @$6.00		$32,660	
Back & side walls, 5' planking w 1/8" puckboard		$1,400	
Double layer vent curtain, 160', 4-5.5' openings		$8,000	
Waterers, 6 @ $300		$1,800	
Posts, wire, cable		$1,000	
Water line, from yard source		$2,000	
Electrical to building and water		$2,000	
Lights, 8 pulse-start metal halide, controls, timers		$2,500	
Site prep, sloping, earthen manure storage, gravel, etc		$7,500	
Loading chute, handling area & chute		$3,500	
Concrete floor & manure push area 7216 ft^2 @ $3.50		$27,000	
Feedbunk epoxy coating 160'x3' wide @ $5.50		$2,640	
Metal panel gates		$2,000	
Hutches, 18 @ $333		$6,000	
Total		**$100,000**	
Machinery & Equipment			
Tractor & Loader (25% share used)		$15,000	
Feed Processing & Handling		$5,000	
Feed Storage (bins)		$5,000	
Truck (25% share used)		$5,000	
Miscellaneous (tools,supplies, etc.)		$5,000	
Total Machinery & Equipment		**$35,000**	
Total Capital Investment		**$140,000**	

			Your Cost
B. FIXED COSTS			
3. Depreciation:	**Original Value - Salvage Value / Useful Life**		
3.01 Facilities			
	$100,000	original value	
-	$10,000	salvage value	
÷	20	years useful life	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	**$90.25**	**/heifer**	
3.02 Machinery & Equipment			
	$35,000	original value	
-	$7,000	salvage value	
÷	12	years useful life	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	**$46.79**	**/heifer**	
4. Investm	**Original Value +Salvage Value / 2 x Investment Rate**		
4.01 Land			
	$5,000	land cost	
x	4.0%	investment rate	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	**$4.01**	**/heifer**	
4.02 Facilities			
	$100,000	original value	
+	$10,000	salvage value	
÷	2	average	
x	4%	investment rate	
x	732	days rearing period	
÷	365	days/year	
÷	100	heifers	
=	**$44.12**	**/heifer**	

			Your Cost
4.03 Machinery & Equipment			
	$35,000	original value	_____
+	$7,000	salvage value	_____
÷	2	average	_____
x	4.0%	investment rate	_____
x	732	days rearing period	_____
x	365	days/year	_____
÷	100	heifers	_____
=	**$16.85**	**/heifer**	_____
C. Labour:			
	12.0	hours/heifer/year	_____
x	732	days rearing period	_____
÷	365	days/year	_____
x	$10.00	/hour	_____
=	**$240.66**	**/heifer**	_____

For further assistance contact you local Manitoba Agriculture and Food office.

Prepared by:

Peter Blawat, P.Ag.
Farm Management Specialist

Tom Droppo, M.Sc., C.I.M., P.Ag.
Manitoba Dairy Specialist

Fred Hardy, P.Ag.
Farm Management Specialist

Earl Hjelte, P.Ag.
Central Region Dairy Specialist

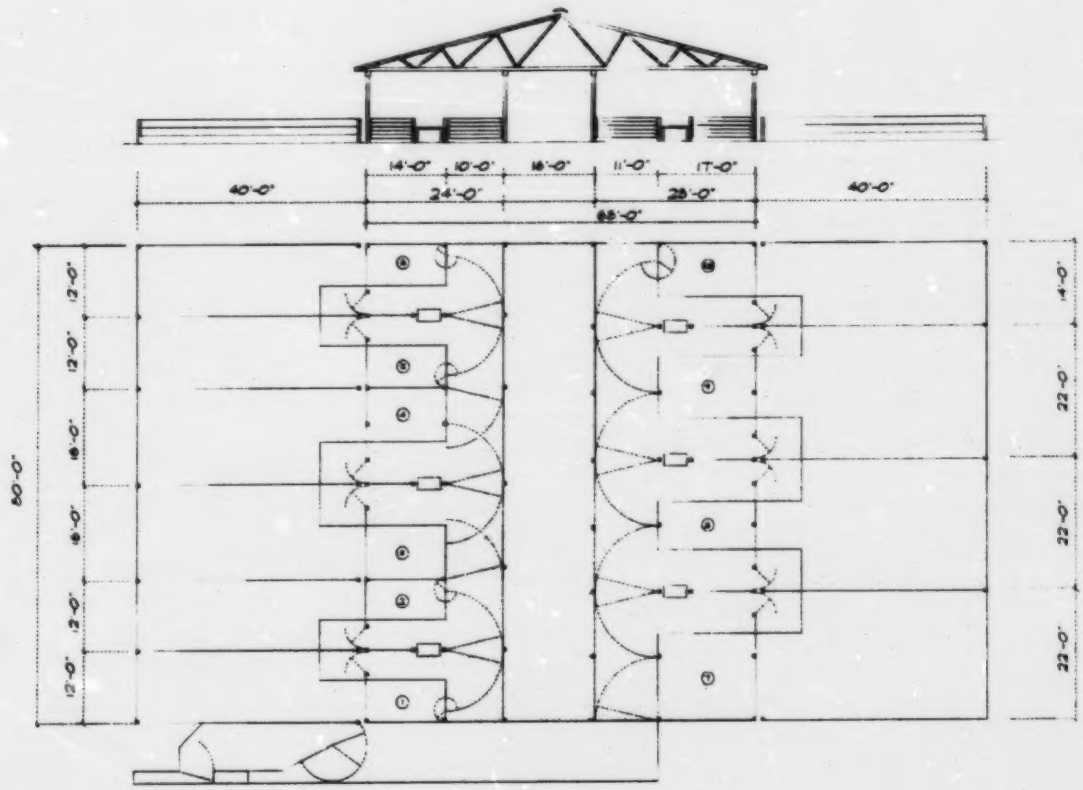
Doug Jackson, P. Eng.
Central Region Engineer

Karen Dupchak, P.Ag.
Manitoba Dairy Nutritionist

Lyle McNichol, P Ag.
NW Region Livestock Specialist

Scott Atkins, P. Ag.
E/I Region Livestock Specialist

Appendix: Dairy Heifer Facility



Pen	Age Months	Number Animals	Sq. Ft. per head	Bunk Space inches/head
1	2-4	9	32.0	16.0
2	4-6	9	32.0	16.0
3	6-9	12	32.0	16.0
4	9-12	12	32.0	16.0
5	close up heifers	8	36.0	18.0
6	close up dry cows	6	48.0	24.0
7	12-16	16	38.5	16.5
8	16-20	16	38.5	16.5
9	20-24	16	38.5	16.5
10	dry cows	10	39.2	16.8